Product Description Document
Proposed use of ICAO Meteorological Information Exchange Model (IWXXM) format for aviation messages
July 16, 2019

Part 1 – Mission Connection

1. Product Description:

The National Weather Service (NWS), as part of its mission, creates and disseminates aviation-related meteorological data, including METAR, TAF, SPECI, SIGMET and other products. The World Meteorological Organization, under the sponsorship of the International Civil Aviation Organization (ICAO), created the ICAO Meteorological Information Exchange Model (IWXXM) data format to report aviation weather information in eXtensible Markup Language (XML). IWXXM includes XML-based representations for products standardized in ICAO Annex 3 and WMO No. 49, Vol II, to be used for machine-to-machine operational exchanges of meteorological information for use in aviation. Unlike the traditional forms of the ICAO Annex 3 / WMO No. 49 products, IWXXM is not intended to be directly read by humans; it is designed to be consumed by software acting on behalf of the data user, such as display software or web feature services. Each IWXXM message contains all of the components that completely describe the product, e.g., issue time, issue status (routine, amendment, etc), and the specific meteorological parameters, including units of measure, that constitute the specific Annex 3 product being disseminated. Supplemental, non-Annex 3 content in NWS products are preserved in IWXXM with the use of extension elements in the XML documents.

If approved, with appropriate user notification, NWS may extend the use of XML formatted data to other existing operational NWS products.

2. Purpose/Intended Use:

IWXXM represents the first step to move to an environment where the systems handling this data can make more use of standard applications and techniques. The development of new systems which provide and support digital Operational Meteorological (OPMET) information require initial investment, but the use of enabling data exchange standards for other domains such as AIXM (Aeronautical Information Exchange Model) and FIXM (Flight Information eXchange Model) along with IWXXM will lead to a cost reduction due to automated data exchange and communications, and the implementation of widely used data modelling techniques including OGC (Open Geospatial Consortium) segments. Consequently, users have opportunities to create new, tailored products at a lower cost by fusing this data.

The bilateral exchange of IWXXM information was introduced in ICAO Annex 3 in November 2013, allowing States to exchange their OPMET data (TAF, METAR, SIGMET, etc) not only in TAC (Traditional Alphanumeric Code form) but also in XML. ***Dissemination of TAF and other Annex 3 products in IWXXM format becomes an international requirement by 5 November 2020 per ICAO Annex 3 Amendment 78.***

3. Audience/Users:
Federal Aviation Administration (FAA), commercial airlines, international, private and commercial companies.

4. Presentation Format:
The data are meant for machine to machine use. The information is available from the National Weather Service Tele-Communications Gateway (NWSTG) under WMO defined T1T2 (from TTAAii) for the following IWXXM data types:

- Aviation Routine Report (METAR) LA
- Aerodrome Forecast (”short” TAF) (VT < 12 hours) LC
- Tropical Cyclone Advisory LK (*)
- Special Aviation Weather Reports (SPECI) LP
- Aviation General Warning (SIGMET) LS
- Aerodrome Forecast (”long” TAF) (VT >= 12 hours) LT
- Volcanic Ash Advisory LU (*)
- Aviation Volcanic Ash Warning (VA SIGMET) LV
- AIRMET LW (*)
- Aviation Tropical Cyclone Warning (TC SIGMET) LY

(*): to be formally adopted by WMO

For example a traditional alpha-numeric content TAF’s WMO ID is FTUS90 KWBC, as an IWXXM the WMO ID becomes LTUS90 KWBC.

5. Feedback Method:
The NWS is accepting comments through May 15, 2020, on the provision of aviation and other existing operational NWS products in IWXXM format. Comments may be provided via email to:

Michael.Graf@noaa.gov

Comments constituting proposed changes to the IWXXM data standard format will necessarily be coordinated with other States through the FAA and ICAO.

For further information, please contact:

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Part 2 – Technical Description

1. Format and Science Basis:

A sample portion of the equivalent IWXXM message:

LTUS42 KGSP 102337
TMLGSP
<MeteorologicalBulletin xmlns="http://def.wmo.int/collect/2014"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://def.wmo.int/collect/2014
http://schemas.wmo.int/collect/1.2/collect.xsd"
gml:id="uuid.60d1f8fd-8665-4102-9ffc-0d1370166c8b"><meteorologicalInformation><TAF
gml:id="uuid.b16c3391-1c87-4b75-b107-ef7d8cc2e86c" permissibleUsage="OPERATIONAL"
status="NORMAL" ...etc.

For a complete example, see a real-time IWXXM TAF message here on the NWS Gateway FTP server.

2. Training:
See the following link to examine the schema, official examples and documentation on IWXXM. For the NWS supplementary content, which the FAA has filed with the ICAO, contained in the IWXXM form, please see here.

3. Availability:
The IWXXM product availability is the same as the TAC product issuance and availability.

1) Products are sent from Warning and Forecast Offices and National Centers to the NCEP Central Operations' (NCO) Next Generation Information Technology Web Services (NGITWS). From here IWXXM products are sent securely to the FAA for use in System Wide Information Management (SWIM) and also over to AMHS.
2) Another avenue for distribution is the National Weather Service Telecommunications Gateway (NWSTG) to store and forward for operational exchange in the international community.
3) Finally the World Area Forecast Center (WAFC Washington) will store IWWXM data for international flight planning per international agreements via the FAA funded WAFC Internet File Service (WIFS).

If approved, in the future, with appropriate user notification, NWS may extend the use of XML-formatted data to other existing operational NWS products.